

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application. Inserted text is indicated with underlining and deleted text is indicated with ~~striketrough~~ or [[double brackets]]. Claim status is indicated as **previously presented**, **currently amended**, **original** or **cancelled**. These claim amendments and the new claims do not introduce new matter.

Listing of the Claims:

1. **(original)** A method of controlling carotenoid accumulation in at least one pineapple cell, the method comprising introducing at least one carotenoid biosynthetic polypeptide expression regulator into said pineapple cell, wherein said carotenoid biosynthetic polypeptide expression regulator controls accumulation of carotenoid in said pineapple cell.
2. **(previously presented)** The method of claim 1, wherein said pineapple cell is an embryogenic cell, an embryogenic callus cell, an organogenic cell, or an organogenic callus cell.
- 3-6. **(cancelled)**
7. **(original)** The method of claim 1, wherein said carotenoid biosynthetic polypeptide expression regulator increases accumulation of carotenoid in said pineapple cell relative to an accumulation of carotenoid in a pineapple cell that lacks said carotenoid biosynthetic polypeptide expression regulator.
8. **(original)** The method of claim 1, wherein said carotenoid biosynthetic polypeptide expression regulator decreases accumulation of carotenoid in said pineapple cell relative to an accumulation of carotenoid in a pineapple cell that lacks said carotenoid biosynthetic polypeptide expression regulator.
9. **(original)** The method of claim 1, wherein said carotenoid biosynthetic polypeptide expression regulator controls accumulation of one or more carotenoids that are selected from group consisting of: phytoene, phytofluene, ζ -carotene, neurosporene, δ -carotene, γ -carotene, α -carotene, β -carotene, apocarotenal, lycopene, canthaxanthin, zeaxanthin, and lutein.
- 10-13. **(cancelled)**

14. **(currently amended)** The method of claim 1, wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide, which nucleic acid segment stably integrates into the genome of said pineapple cell [[:]]

~~wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one sense nucleic acid segment that corresponds to at least a portion of at least one endogenous carotenoid biosynthetic polypeptide gene;~~

~~wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one antisense nucleic acid segment that corresponds to at least a portion of at least one endogenous carotenoid biosynthetic polypeptide gene;~~

~~wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide transcription factor;~~

~~wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide promoter and/or at least one carotenoid biosynthetic polypeptide enhancer, which nucleic acid segment homologously recombines with at least one promoter and/or at least one enhancer of at least one endogenous carotenoid biosynthetic polypeptide gene;~~

~~wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide that is heterologous to said pineapple cell; [[or,]]~~

~~wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide that is homologous to at least one endogenous carotenoid biosynthetic polypeptide of said pineapple cell.~~

15. **(original)** The method of claim 1, wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide, which nucleic acid segment is linked to a selectable marker.

16. (previously presented) The method of claim 1, wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide, which nucleic acid segment is operably linked to a constitutive promoter or to an inducible promoter.

17-30. (cancelled)

31 (original) The method of claim 1, wherein said pineapple cell is an organogenic cell produced by culturing at least one meristemic cell.

32 (original) The method of claim 31, wherein said meristemic cell is a non-apical meristemic cell.

33 (original) The method of claim 31, wherein said culturing comprises culturing said meristemic cell to produce at least one shoot, and culturing at least one explant from said shoot to produce said organogenic cell.

34-38. (cancelled)

39. (original) A method of altering pineapple plant coloration, the method comprising introducing at least one carotenoid biosynthetic polypeptide expression regulator into at least one pineapple plant, wherein said carotenoid biosynthetic polypeptide expression regulator controls accumulation of at least one colored carotenoid in said pineapple plant, thereby altering said coloration of said pineapple plant.

40-42. (cancelled)

43. (original) The method of claim 39, wherein said colored carotenoid is selected from group consisting of: phytoene, phytofluene, ζ -carotene, neurosporene, δ -carotene, γ -carotene, α -carotene, β -carotene, apocarotenal, lycopene, canthaxanthin, zeaxanthin, and lutein.

44-47. (cancelled)

48. (currently amended) The method of claim 39, wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide, which nucleic acid segment stably integrates into the genome of said pineapple plant [[:]]

~~wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide, which nucleic acid segment is operably linked to a promoter that promotes fruit specific expression of said carotenoid biosynthetic polypeptide;~~

~~wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one sense nucleic acid segment that corresponds to at least a portion of at least one endogenous carotenoid biosynthetic polypeptide gene;~~

~~wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one antisense nucleic acid segment that corresponds to at least a portion of at least one endogenous carotenoid biosynthetic polypeptide gene;~~

~~wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide transcription factor;~~

~~wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide promoter and/or at least one carotenoid biosynthetic polypeptide enhancer, which nucleic acid segment homologously recombines with at least one promoter and/or at least one enhancer of at least one endogenous carotenoid biosynthetic polypeptide gene;~~

~~wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide that is heterologous to said pineapple plant; or,~~

~~wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide that is homologous to at least one endogenous carotenoid biosynthetic polypeptide of said pineapple plant.~~

49-65. (cancelled)

66. (original) The method of claim 39, wherein said carotenoid biosynthetic polypeptide expression regulator is introduced into at least one pineapple cell from which said pineapple plant is regenerated.

67 and 68. (cancelled)

69. (original) A pineapple cell that comprises at least one introduced carotenoid biosynthetic polypeptide expression regulator, which carotenoid biosynthetic polypeptide expression regulator controls accumulation of carotenoid in said pineapple cell.

70 (previously presented) The pineapple cell of claim 69, wherein said pineapple cell is an embryogenic cell, an embryogenic callus cell, an organogenic cell, or an organogenic callus cell.

71-76. (cancelled)

77. (original) The pineapple cell of claim 69, wherein said carotenoid biosynthetic polypeptide expression regulator controls accumulation of one or more carotenoids that are selected from group consisting of: phytoene, phytofluene, ζ -carotene, neurosporene, δ -carotene, γ -carotene, α -carotene, β -carotene, apocarotenal, lycopene, canthaxanthin, zeaxanthin, and lutein.

78-84. (cancelled)

85. (currently amended) The pineapple cell of claim 69, wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide that is selected from the group consisting of: an isopentenyl diphosphate isomerase, a geranylgeranyl pyrophosphate synthase, a phytoene synthase, a phytoene desaturase, a ζ -carotene desaturase, a lycopene β -cyclase, a lycopene ϵ -cyclase, a β -carotene hydroxylase, and an ϵ -hydroxylase [[:]]

~~wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one sense nucleic acid segment that corresponds to at least a portion of at least one endogenous carotenoid biosynthetic polypeptide gene;~~

~~wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one antisense nucleic acid segment that corresponds to at least a portion of at least one endogenous carotenoid biosynthetic polypeptide gene;~~

~~wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide transcription factor;~~

~~wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide promoter and/or at least one carotenoid biosynthetic polypeptide enhancer, which nucleic acid segment homologously recombines with at least one promoter and/or at least one enhancer of at least one endogenous carotenoid biosynthetic polypeptide gene;~~

~~wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide that is heterologous to said pineapple cell; or,~~

~~wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide that is homologous to at least one endogenous carotenoid biosynthetic polypeptide of said pineapple cell.~~

86-96. (cancelled)

97. (original) A pineapple plant that is regenerated from said pineapple cell of claim 69.

98. (new) The method of claim 1, wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment selected from:

- (a) a sense nucleic acid segment that corresponds to at least a portion of at least one endogenous carotenoid biosynthetic polypeptide gene;
- (b) an antisense nucleic acid segment that corresponds to at least a portion of at least one endogenous carotenoid biosynthetic polypeptide gene;
- (c) a nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide transcription factor;
- (d) a nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide promoter and/or at least one carotenoid biosynthetic polypeptide enhancer, which nucleic acid segment homologously recombines with at least one promoter and/or at least one enhancer of at least one endogenous carotenoid biosynthetic polypeptide gene;

- (e) a nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide that is heterologous to said pineapple cell; and,
- (f) a nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide that is homologous to at least one endogenous carotenoid biosynthetic polypeptide of said pineapple cell.

99. (new) The method of claim 1, wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment, which when expressed in said pineapple cell, produces a double stranded RNA (dsRNA) that targets the destruction of a target endogenous mRNA encoding a carotenoid biosynthetic polypeptide.

100. (new) The method of claim 14, wherein said pineapple cell further comprises at least a second carotenoid biosynthetic polypeptide expression regulator comprising at least one nucleic acid segment, which when expressed in said pineapple cell, produces a double stranded RNA (dsRNA) that targets the destruction of a target endogenous mRNA encoding a carotenoid biosynthetic polypeptide.

101. (new) The method of claim 39, wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment selected from:

- (a) a nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide, which nucleic acid segment is operably linked to a promoter that promotes fruit-specific expression of said carotenoid biosynthetic polypeptide;
- (b) a sense nucleic acid segment that corresponds to at least a portion of at least one endogenous carotenoid biosynthetic polypeptide gene;
- (c) an antisense nucleic acid segment that corresponds to at least a portion of at least one endogenous carotenoid biosynthetic polypeptide gene;
- (d) a nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide transcription factor;
- (e) a nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide promoter and/or at least one carotenoid biosynthetic polypeptide enhancer, which nucleic acid segment homologously recombines with at least one promoter and/or at

least one enhancer of at least one endogenous carotenoid biosynthetic polypeptide gene;

- (f) a nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide that is heterologous to said pineapple plant; and,
- (g) a nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide that is homologous to at least one endogenous carotenoid biosynthetic polypeptide of said pineapple plant.

102. (new) The method of claim 39, wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment, which when expressed in said pineapple cell, produces a double stranded RNA (dsRNA) that targets the destruction of a target endogenous mRNA encoding a carotenoid biosynthetic polypeptide.

103. (new) The method of claim 48, wherein said pineapple plant further comprises at least a second carotenoid biosynthetic polypeptide expression regulator comprising at least one nucleic acid segment, which when expressed in said pineapple plant, produces a double stranded RNA (dsRNA) that targets the destruction of a target endogenous mRNA encoding a carotenoid biosynthetic polypeptide.

104. (new) The pineapple cell of claim 69, wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment selected from:

- (a) a sense nucleic acid segment that corresponds to at least a portion of at least one endogenous carotenoid biosynthetic polypeptide gene;
- (b) an antisense nucleic acid segment that corresponds to at least a portion of at least one endogenous carotenoid biosynthetic polypeptide gene;
- (c) a nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide transcription factor;
- (d) a nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide promoter and/or at least one carotenoid biosynthetic polypeptide enhancer, which nucleic acid segment homologously recombines with at least one promoter and/or at least one enhancer of at least one endogenous carotenoid biosynthetic polypeptide gene;

- (e) a nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide that is heterologous to said pineapple cell; and,
- (f) a nucleic acid segment that encodes at least one carotenoid biosynthetic polypeptide that is homologous to at least one endogenous carotenoid biosynthetic polypeptide of said pineapple cell.

105. (new) The pineapple cell of claim 69, wherein said carotenoid biosynthetic polypeptide expression regulator comprises at least one nucleic acid segment, which when expressed in said pineapple cell produces a double stranded RNA (dsRNA) that targets the destruction of a target endogenous mRNA encoding a carotenoid biosynthetic polypeptide.

106. (new) The pineapple cell of claim 85, wherein said pineapple cell further comprises at least a second carotenoid biosynthetic polypeptide expression regulator comprising at least one nucleic acid segment, which when expressed in said pineapple plant produces a double stranded RNA (dsRNA) that targets the destruction of a target endogenous mRNA encoding a carotenoid biosynthetic polypeptide.